

- ☒ fossil energy
- ☐ environmental
- ☐ energy efficiency
- ☐ other

## FINE PARTICULATE CONTROL

### States Impacted:

All states with coal-fired-combustion power plants

### Benefit Areas:

U.S. Technology Leadership,  
Environmental, Cost Savings

### Participants:

EERC, W.L. Gore, Otter Tail  
Power Company, Electric  
Power Research Institute,  
Wahlco International

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### Description

The Energy and Environmental Research Center (EERC) of the University of North Dakota is developing and demonstrating a novel technology called the advanced hybrid particulate collector (AHPC). The AHPC takes the best aspects of electrostatic precipitation and fabric filtration technologies and puts them into a single box.

EERC has a long history of researching various aspects of particulate matter emitted from coal-fired combustion systems. Beginning in the early 1970s, EERC was instrumental in developing resistivity correlations for electrostatic precipitators (ESPs). In the mid 1980s, the work at EERC shifted toward the use of fabric filters. A new technology was developed called flue gas conditioning that reduced fine particulate emissions and pressure drop across baghouses. This technology used small amounts of ammonia and sulfur trioxide to form a more cohesive dust cake at the ash-fabric interface. A much greater understanding of dust cake cohesiveness was one of the major results of this research.

### Goals

The goal of fine particle work at EERC is to continue developing more effective and lower-cost particulate control technologies.

### Tangible Benefits

**National:** The U.S. electric utility industry has benefited from EERC's fine particulate research. Resistivity correlations are being used in the design of new ESPs. Flue gas conditioning dramatically reduces fine-particle emissions and pressure drop across fabric filters. The AHPC has proven very effective at pilot scale and will soon be demonstrated on a slip stream at a coal-fired electric utility. EERC expects to receive a patent for this technology in the very near future and a multibillion dollar global market for this technology has been projected. AHPC technology applications and markets beyond fossil energy are being explored. Potential larger national and international markets exist for this technology.

**Regional:** EERC's pioneering work with ESPs has greatly affected how the North Dakota lignite industry has designed ESPs. Particulate matter generated from lignites generally was not effectively removed by ESPs using designs from plants firing high-sulfur bituminous coals. Therefore, alternate ESP designs or baghouses were used. The AHPC will be demonstrated at a utility in the South Dakota.